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P U B L I C A T I O N S  
OF THE  
Astronomical Society of the Pacific.

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ADDRESS OF THE RETIRING PRESIDENT OF  
THE SOCIETY READ AT THE FIFTEENTH  
ANNUAL MEETING, MARCH 28, 1903.

BY C. D. PERRINE.

It has been the custom for the retiring Presidents to address the Society on the occasions of its annual meetings. The award of the Bruce Gold Medal since its foundation, and an account of the work of the recipient has occupied, naturally, the chief place in these annual addresses. As no award of the medal has been made this year, I shall take the opportunity to review the progress of the Society in certain directions, with a view to pointing out some of its most useful fields and urgent needs.

The formation of the Society was almost spontaneous, and the direct result of the solar eclipse of New Year's day, 1889, when so many of the amateur photographers visited the region of totality in northern California. At the time of its organization, the Astronomical Society of the Pacific was the only active astronomical association in the United States, amateur or professional.

One of the first acts of the Society was to commence a series of *Publications* to contain popular accounts of current astronomical work and observations made by its members. As there were at this time but two journals in America devoted entirely to astronomical science, there was also a wide and useful field for the Society's publications in printing original investigations. This field was at once occupied as fully as the conditions would permit. Although the Society was organized almost wholly of persons interested in astronomy as a pastime only, it now numbers many prominent scientists among its members, and there has been much substantial scientific work in its proceedings from the first. The result has been that its publications have

taken and fill an honorable place with the scientific institutions and individuals of the world, as well as maintaining the original aim of the Society, to diffuse current astronomical information in a form to be understood by the non-professional.

Early in the history of the Society, substantial foundations began to come to it from its wealthy members. The first of these was the Comet-Medal established by JOSEPH A. DONOHUE. A number of medals and prizes for the discovery of comets had been awarded during the previous half-century. These were given principally by European rulers and one or two scientific societies, and were awarded in specific cases. There was no permanent foundation for any of them, and all have been discontinued. Mr. DONOHUE'S gift was sufficient to maintain a medal in perpetuity. This medal is intended solely as a recognition of the discovery of an unexpected comet, and in no way as a reward.

The Donohoe Comet-Medal foundation was soon followed by the gift of a fund by ALEXANDER MONTGOMERY for the purchase of the nucleus of an astronomical library and for its maintenance. With this beginning the library has grown rapidly, principally through accessions by gift from observatories and scientific societies, until it now numbers over twelve hundred bound volumes and a large number of pamphlets. One of the very useful fields for the Society is to own a complete astronomical library, and to have it available for reference purposes.

In 1897 Miss CATHERINE WOLFE BRUCE, who has done so much for astronomical science on both sides of the Atlantic, gave the Society a sum of money sufficient to maintain a gold medal, to be awarded to those astronomers who have done most to advance the science. The Bruce Gold Medal, like the Donohoe Comet-Medal, is international in character.

In 1892 it was decided to place the fees of the life members in a separate fund, so long as the member lived. At his death the fee was to be used for the general expenses of the Society. Previous to this time all such fees had been put into the General Fund. After 1892, however, all the fees received from life members were placed in the Life Membership Fund, and any surplus general funds at the end of the year were also transferred toward the representation of the full number of life members, until at present this fund contains \$1,700. As there are

seventy life members, the present balance is only about half as large as it should be. This fund is intended as a guarantee to the members who have paid their dues long in advance.

The Society has suffered the loss by death, during the past year, of several of its members. Two of them bequeathed substantial sums of money to the Society: Mr. MORRIS REIMAN, of Chicago, left the sum of \$500, and Mr. JOHN DOLBEER, of San Francisco, the sum of \$5,000. I believe that no conditions have been attached to either of these gifts. They can, therefore, be used in the way most beneficial to the Society. It is not too much to say that such bequests are of the highest possible value. They are extremely adaptable and thus available for a great variety of purposes.

Such bequests should be made of perpetual use, by treating them as endowments or expending them for some concrete purpose. In the present state of our Society, with so many funds already established for specific purposes, and the need for a larger yearly income, there can be no doubt as to the disposition that should be made of them. They should be invested in good interest-bearing securities and the incomes only used. Each fund should be kept entirely distinct, and should, of course, bear the name of the donor. The incomes should be expended, as far as possible, for some particular purpose, so that proper recognition may always be accorded and the usefulness of such gifts traced.

The income of the Reiman Fund may very properly accumulate for several years until there is sufficient to furnish a high-class illustration for one of the *Publications*. Such illustrations are badly needed.

The greater income from the Dolbeer Fund will fill a larger field. The most pressing need now is towards an enlargement of our *Publications* and a greater number of illustrations for them of the highest excellence. No better immediate use can be found for the income from this fund than to supply some of these urgent needs of the *Publications*. If these wants are supplied later through other channels,—and it is hoped that they will be,—the income of the Dolbeer fund would be relieved and could be applied to other purposes. I may mention some ways in which such incomes could be most usefully expended.

Our knowledge of comets, particularly of their origin and

family history, is to be increased principally through observations of those which are permanent members of the solar system. Many periodic comets have been discovered, but a large proportion of them have been missed at subsequent returns to perihelion and entirely lost. The searching for these bodies at their predicted returns is usually done at some of the large observatories having powerful telescopes, and, recognizing the importance of the work, it is conscientiously prosecuted. In many cases where the return of such a comet has been missed it is undoubtedly because the comet has become too faint to be seen even with powerful telescopes. But it is probable that some comets, at least, have been missed because unknown disturbances in their orbits have occurred, which caused them to be so far from their predicted places as to be beyond the region searched. The field of a large telescope is so limited that it is only possible to sweep over a comparatively small area of sky in the time usually available for such searches. When near perihelion and at their greatest brightness, these comets are frequently on the opposite side of the Sun from the Earth, and so nearly in the same line, that only a short time is available after sunset or before sunrise for the search. It is therefore desirable for as many observers as possible to take part in the searches. Encouragement is needed to induce those not now engaged in such work to take it up. The best form for such encouragement would be money prizes for the re-discovery of such periodic comets as have been observed at only one apparition, or those which are of special importance and are likely to pass unobserved. The amount of the prize could be varied according to the importance of the discovery.

Another field which requires exploiting is that of simplifying the numerical operations in astronomical computations and adapting mechanism to the solution of problems which must be repeated many times. The growth of astronomical work has been so rapid that there is now in all observatories and computing bureaus a great amount of routine calculation.

Calculating-machines have been invented to perform the simple arithmetical operations and have proven most valuable. We need, however, to go a step farther and put some steel brains into them, so that they will perform all the operations in a given problem, *e. g.* the computation of ephemerides, reduc-

tions of star-places, etc. Many of these special problems can be solved by machinery, and the time has come to encourage its invention. This can best be done by offering substantial prizes for machines which will satisfactorily do specific pieces of work.

It is one of the functions of a scientific society to assist investigators and inventors in the solution of special problems. Instances of members of this Society supplying such aid are not wanting. I need only mention such names as MILLS, CROCKER, HEARST, BRUCE, DOLBEER, and PIERSON to recall some of them.

The wide field that is open to our publications has already been spoken of. This field is only partially occupied at present, owing to a lack of funds. The income from the members, after meeting the general expenses of the Society, is only sufficient to maintain the publications in their present quantity. A Publication Fund of \$25,000 is badly needed to permit of the necessary expansion and improvement. The income from such a fund, together with the amount which would be available from the General Fund, would meet this demand.

Another of the ways in which the Society can be very useful is in creating and maintaining an interest in actual observation of the heavens. In San Francisco there are many people who are already interested in astronomy and many more who would become interested and find pleasure and instruction in looking at the wealth of objects which are to be seen with a telescope of some power. The matter of an observatory for the Society was broached a number of years ago and a site in Golden Gate Park secured. I take this occasion to again call attention to the desirability of such an establishment. An equatorial telescope of ten or twelve inches aperture, with the necessary accessories and a suitable dome and observatory building, would cost about \$10,000.

I have spoken freely of some of the more important ways in which the Society can be aided financially, in the hope that some of our members, knowing of them, may be able to assist in supplying them.

The broadening influence of science, and particularly astronomy, cannot be overestimated. As the public school has become the birthright of every American boy and girl, so will a knowledge of science be looked upon in future years as a

necessary part of their course of study and one of the most potent of civilizing forces.

Perhaps the most important of the fields open to our Society is that of diffusing a more general knowledge of astronomical science.

A suggestion has been made by one of our members which, if it can be carried out, would be most fitting and in many ways a benefit to the Society. It is that the Society become one of the affiliated institutions of the State University. It seems eminently proper that scientific societies should cluster around a great University.

It has been found that more or less confusion in regard to finances arose from the non-coincidence of our fiscal year with the calendar year. To obviate this difficulty two financial reports are rendered at this meeting, one covering the period from April 1, to December 31, 1902; the other from January 1, to March 31, 1903.

It seems to me that we should avoid, if possible, paying a deficit out of the income from the following year (which has its own proper demand). Accumulated deficiencies, which are possible in this way, will cause a stagnation and endanger the usefulness of the Society.

Article IX of the By-Laws has been amended so that the meetings of the Society are made more uniform and convenient.

To encourage students in universities and high schools to become members of the Society, special provisions have been made whereby their fees are reduced during such time as they are actually enrolled as students. It is hoped in this way to give many an opportunity of enjoying membership who otherwise would be debarred for several years.

It is highly desirable, as soon as arrangements can be made to do so, that the rooms and library of the Society be kept open during the greater part of each week-day. The library should be much more accessible than it now is.

At present there are but three meetings of the Society in San Francisco. These are public meetings. A system of informal meetings for reading and discussion, if inaugurated by the members residing in and about San Francisco, would be found very helpful. Such meetings could be held monthly, or weekly if desirable.

In conclusion, I wish to thank the officers and members of the Society for their cordial help and co-operation during the past year. Without such assistance my duties would have been much less easy.

MT. HAMILTON, CAL., March 16, 1903.

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PARALLAX OF THE BINARY SYSTEM *DELTA EQUULEI*.\*

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BY W. J. HUSSEY.

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The object of this communication is to present a value of the parallax to  $\delta$  *Equulei* obtained by using as data the elements of the orbit derived from micrometrical measures and the relative velocity of the components in the line of sight furnished by spectroscopic observations. While the result given is merely provisional, one to be improved when better elements of the orbit are available, as they no doubt will be after two or three years more, yet it is thought that it has already a measure of certainty which places it in the list with the more accurately determined stellar parallaxes. Moreover, the manner of its derivation differs from previous determinations. The use of comparison-stars and the uncertainties of their assumed distances are eliminated. In theory the method leads to an absolute value of the parallax, and not to a relative one, as is necessarily the case when comparison-stars are employed.

The mathematical relations connecting the elements of the orbit of a binary, the relative velocity of its components in the line of sight, and the parallax of the system, have long been known. Applications have hitherto been wanting for the reason that no double stars had been found which furnished all the data needed.  $\delta$  *Equulei* has proven an exception. The elements of its orbit are approximately known, and in 1901, at the time of the last periastron passage, the relative velocity of the components in the line of sight was so great that the spectra of the two stars were displaced to a measureable extent.

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\* *Bulletin* of the Lick Observatory, No. 32.